# AUTOTURN® PROFESSIONAL 3D

MODEL, ANALYZE, AND VISUALIZE IN 3D

8¹

NEW AASHTO 2011 STANDARDS

AutoTURN Pro 3D is state-of-the-art CAD software that simulates 3D vehicle turning maneuvers on surface and mesh object terrains. Incorporating the trusted AutoTURN engine together with the patent pending process of generating a three-dimensional vehicle swept path envelope – engineers can design and analyze in 3D while accounting for the effects of different terrain, obstacles, and vehicle parameters.
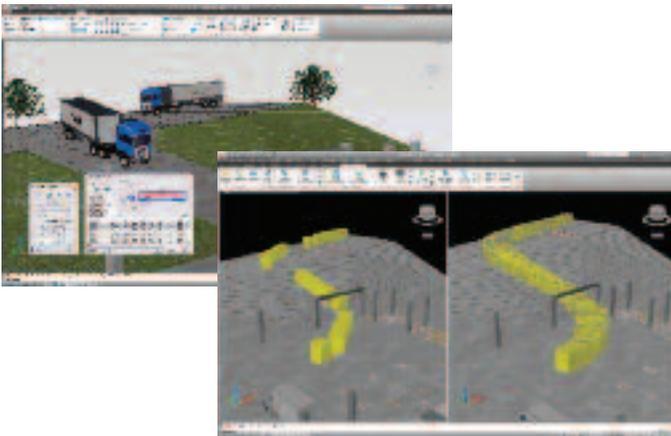
›› AutoTURN Pro 3D gives engineers the ability to respond to changes faster and optimize designs with even better analysis and visualization techniques.

» MODEL 3D VEHICLE SWEPT PATHS

Generate 3D swept path envelopes with vehicle height and ground clearances to analyze designs in a three-dimensional space. Users also have the options to display the 3D swept path of the vehicle body or body clearance.

Assess the cross-section of the 3D swept path at any instance along a 3D simulation. A punch through report can also be created showing the 3D swept path cross-sectional, the terrain surface, and the punch through line.

» GENERATE 3D VEHICLE ARC PATHS

Analyze, and visualize in three dimensions by generating a 3D arc path directly on a selected terrain (Civil 3D® surface, polygon and polyface mesh in AutoCAD® and MicroStation®). You can also convert a 2D simulation into 3D by selecting a terrain. Boost your efficiency by completing a conceptual design in a 2D plan view while allowing for further analysis in a 3D mode.

» DYNAMIC 3D VEHICLE CONFLICT ANALYSIS

Carry out a conflict analysis to detect where geometric objects in a design drawing can interfere with the vehicle's 3D swept path. The section of a 3D swept path will display in a different color indicating collisions with objects or terrain.
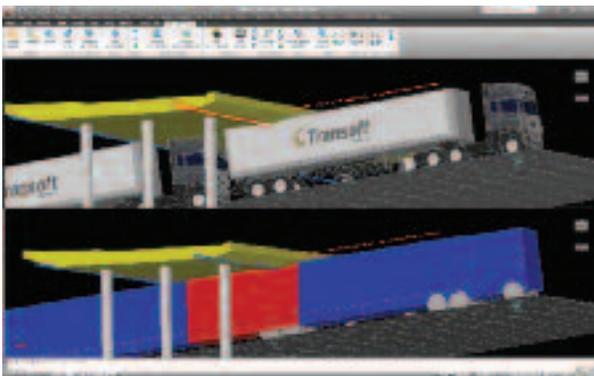
›› Create a 3D vehicle using custom roofline and ground clearance values for the front, rear, and wheelbase of a vehicle.

» EVALUATE VERTICAL AND GROUND CLEARANCES

Create a report displaying the terrain, vehicle, and clearance profile to check for spatial requirements between overhead obstacles and the design vehicle. Vertical clearance is not restricted to a straight line but can be analyzed at any point along the path of the simulation.
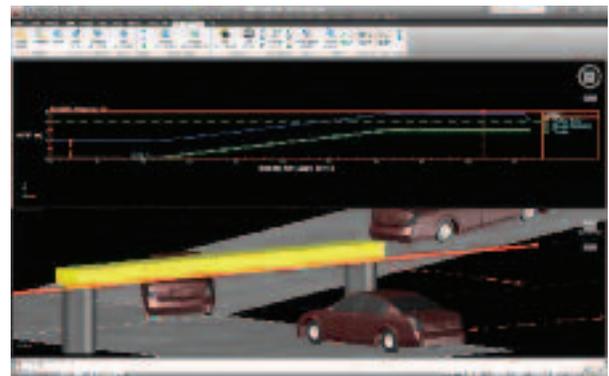
›› By incorporating terrain elevation, overhead obstacle, and vehicle clearance data together, issues are now detected and can be resolved using a 3D space.

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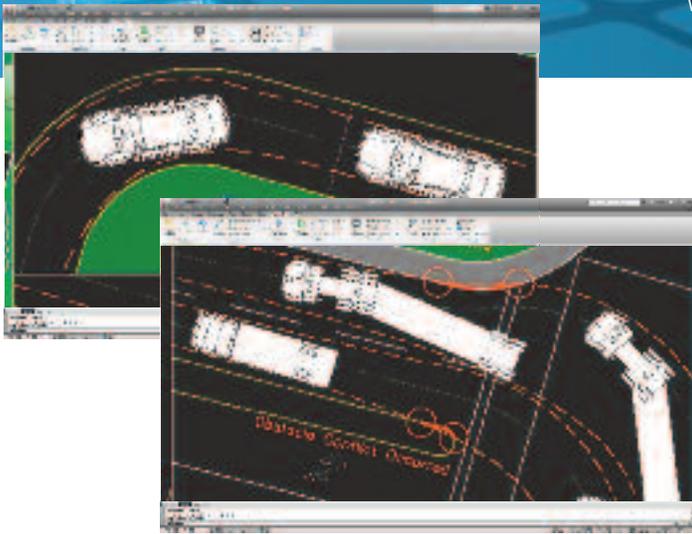
›› AutoTURN improves the user experience by creating a direct relationship between simulations and CAD geometry enhancing the quality of your overall design.

» ASSESS VEHICLE MANEUVERS EASILY

Carry out multiple turning simulations using different vehicles and configurations to see if they can be accommodated by your designs. Even complex turning situations (roundabouts) are quickly and easily evaluated using powerful features like the **Generate Oversteer Corner** tool.

Other advanced options, like the ability to set steering linkage ratios between the front and rear axle groups of multi-part vehicles, provide a more realistic representation of how a vehicle would handle tight turning situations - very useful when generating articulated bus and truck movements.

›› Evaluate different vehicle turning scenarios for complex roadway geometry.

» SPECIALIZED TRANSPORTATION SYSTEMS

Large scaled construction and sustainability (e.g. wind farms) projects are increasing meaning a growing number of oversized and more complex vehicles navigating roadways. AutoTURN now supports these specialized transportation systems with new vehicle types including wind tower trailer, wind blade trailer, beam transporters, booster trailer, and 19-axle heavy haul.
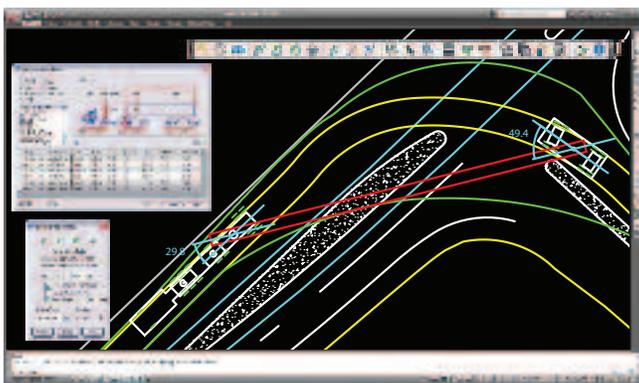
›› Check the drive path of large, complex vehicles carrying cargo to prevent damage to the load or surrounding structures.

» ADVANCED DESIGN CAPABILITIES

Adaptive vehicle simulations are now linked directly to CAD geometry and can be placed offset from or centered on user-drawn paths made from lines, arcs, polylines, complex chains, and even AutoCAD® Civil 3D® alignments. Vehicle path simulations are automatically updated based on changes to the linked design geometry meaning fewer iterations in the design process.

» CONFLICT DETECTION FEATURES

Get real-time visual feedback when AutoTURN detects conflicts between a vehicle simulation and objects such as curbs, median islands, sign posts, and street lights in the drawing. AutoTURN also includes the ability to recreate an existing simulation accounting for any changes to the obstacles that interact with the vehicle's envelope.

» MODEL REAL WORLD SITUATIONS

You're in the driver's seat when managing design challenges. Use the combined functionality of the **SmartPath** tools in a single simulation to model vehicle movements for site planning. Negotiate tight turns for entrances and aisle ways. Use the **Select Sweep** tool to set vehicle alignment to existing CAD geometry for carrying reverse maneuvers for vehicles to a **maximum of 3 parts**.

›› Powerful features make vehicle reverse maneuvers easier than ever. Hatch vehicle body envelopes and swept paths to check for clearances.

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Bentley Sustaining Infrastructure

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AUTOTURN PROFESSIONAL 3D

AutoTURN is the latest technology for vehicle swept path analysis and modeling. Simulating forward and reverse vehicle turn maneuvers is now quick and easy due to the **four SmartPath Tools interactive drive modes** that incorporate speed, superelevation, lateral friction, and turn radius algorithms.

›› **GENERATE ARC PATH**
Quickly and easily create turn simulations, such as through roundabouts, by dragging your mouse and clicking from point to point.

›› **GENERATE CORNER PATH**
Produce simulations using an entrance and exit tangent with the option of setting a vehicle's speed and radius – ideal for designing intersections.

›› **GENERATE OVERSTEER CORNER**
Offers a realistic representation of how a vehicle negotiates tight turning conditions; particularly useful for multi-part, articulated vehicles.

›› **STEER A PATH**
For areas with limited maneuvering space, you can freely drive a vehicle at speed by moving the mouse in the desired direction.

» 3D VEHICLE PATH SIMULATIONS

- Place a 3D vehicle simulation on a terrain using geometry for lines, arcs, polylines, and alignments (simulations are reactive and are updated when changes are made to the source geometry)
- Ability to generate a 3D vehicle simulation based on a pre-defined path
- Ability to delete the last section of a 3D simulation for minor editing purposes
- Input the 3D vehicle's starting angle and speed associated with the simulation
- Ability to display radius type and radius value for a 3D vehicle path movement

» 3D DESIGN AND ANALYSIS ABILITIES

- Perform 3D design and analysis by generating a 3D arc path directly on a selected terrain
- Convert 2D turn simulations created with the 2D SmartPath Tools and Place Adaptive Simulation into equivalent 3D turn simulations
- Work with selected terrain generated from: TORUS and NEXUS grading models; AutoCAD® Civil 3D® surface; AutoCAD® polygon or polyface mesh; MicroStation® mesh
- Ability to work on multiple terrain by choosing the current active terrain
- Analyze a cross-section through the 3D swept path at any selected user point for evaluating tunneling, spatial requirements near buildings or overhead clearance to structures
- Analyze both vehicle bottom and overhead clearance requirements on either a straight line path section or paths with curves
- Section of the 3D swept path will display a different color indicating collision with an object or terrain
- Dynamic visual display of 3D articulation along the axis in a vehicle movement simulation

» 3D PRESENTATION AND REPORTING FEATURES

- Use a sample library of 3D realistic vehicles or user imported realistic 3D models for presentations
- Generate reports including ground profile, body profile, punch through slice, and punch through line
- Create a 2D report indicating the top of the vehicle body; lowest point along the path (i.e. ground clearance); obstacles (indicating locations of intersections between the drive path and obstacles)
- Analyze Punch Through – draw a cross section of a selected 3D turn simulation at a cutting plane line and create an annotated section detail
- Analyze Vehicle Clearance – create a graph showing the longitudinal profile of a 3D turn simulation and crossing elements

» 3D VEHICLES AND CUSTOM VEHICLE CREATION

- All national standard design vehicle libraries (AASHTO, TAC, Austroads, etc) includes 3D parameters
- Create or import your own 3D drawings for custom vehicles
- Specify three different ground clearances (front, wheelbase, rear) and the front and rear chamfer for a custom 3D vehicle
- Ability to enter customized roofline when creating a 3D vehicle
- Realistic 3D vehicle drawings supplied for the vehicles in the TRANSOFT/TRANSOFTM librarieslibrary database

» TURN SIMULATIONS AND SWEPT PATH ANALYSIS

- Place adaptive vehicle simulations on either centered or offset left/right with a smooth transitions option on user-drawn paths made from lines, arcs, polylines, complex chains and even AutoCAD® Civil 3D® alignments
- Link adaptive simulation to path geometry allowing for grip-edits
- Conflict analysis feature provides feedback on vehicle path obstructions
- Use the Regenerate Simulation feature on simulations to account for conflicts that occur after obstacles have been added, removed, or modified
- **SmartPath** tools for forward and reverse vehicle turn simulations in one continuous motion
- Perform 3-part vehicle reverse maneuvers to any vector
- Generate arc, oversteer, offset, and reverse corner simulations
- Generate vehicle swept path envelopes from user-defined vehicle shapes with chamfered corners or filleted radii
- Define and hatch either the vehicle body or the vehicle's outer swept path envelope during a turn simulation

» SPECIALIZED TRANSPORTATION SYSTEMS

- Override Angle for Special Transport is now independent of directional change in the articulating point for the trailer
- Create and simulate vehicles with independent rear steering systems (including crab steering for supported types)
- Ability to numerically input or use the mouse wheel to dynamically control the independent rear steering angle for specialized vehicles
- Create and simulate vehicles with telescoping trailers
- Draw cargo for a vehicle simulation and combine the cargo envelope with the vehicle body envelope
- Define cargo size and set limiting factors for vehicle configuration

For more information on AutoTURN Pro 3D visit our website at **www.transoftsolutions.com**

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» PRESENTATION CAPABILITIES

- Control simulation playback (play, pause, high-speed scrubbing) through the Run Animation Dialog Box
- Use realistic vehicles plan profiles for simulations and animations
- Manage vehicle animations with Transoft Solutions' presentation software, InVision, to create timed and sequenced events. Export files to video formats for PC viewing

» VEHICLE CUSTOMIZATION

- Apply user-defined vehicle dimensions and profiles
- Create vehicles or types for specialized transportation (e.g. rear steering)
- Commonly-used types include: fire trucks, fire engine pumpers, ambulances, garbage collection, semi-trailers, buses (articulated and double articulated), sport utility, pickup, and forklifts
- Add user-defined vehicles and types to the library database
- Work with AutoTURN Extended Vehicle Libraries add-on content

» POWERFUL DESIGN ABILITIES

- Set steering linkage ratios for ranges of steering angles between front and back wheels for multi-axle semi-trailers, trucks and articulated buses
- Specify tire sizing (width and diameter) and space between the tires on the same axle for a vehicle
- Choose track width for axle groups independently within a given part
- Place, remove, or recall vehicles, active simulations, and active pathways
- Modify and edit drawn simulations using Path Control
- Add conical lines of sight to check mirror views, blind spots and headlight paths
- Create standard or custom turning templates using template generator

» VEHICLE LIBRARIES

- Includes national design vehicle libraries for: US (AASHTO, Caltrans), Canada (TAC), Australia (Austroads), UK, France, Germany, Italy, Netherlands, Austria, Norway, Sweden, Switzerland, Czech, Denmark, New Zealand, Brazil, and Iceland
- Use specialized vehicle types including: Wind Tower Trailer; Wind Blade Trailer; Beam Transporter I and II; Booster Trailer; 19-axel Heavy Hauler
- Other vehicle libraries: Architectural and Transoft Solutions' Realistic Type

» REPORTING FEATURES

- Generate turn simulation reports showing vehicle speed, path lengths, and start conditions at each section of the simulation
- View graph report of a vehicle's steering angle and multi-part vehicle's articulation angles when generating or placing a simulation
- View override/path angle for independent rear steering vehicles
- Data can be exported to spreadsheets and standard document formats

» COMPATIBILITY

- AutoCAD® 2007 – 2013 series of products (except AutoCAD LT)
- AutoCAD® Civil 3D® 2010 – 2013
- MicroStation® V8 XM, V8i
- Bentley® PowerDraft (XM, V8i), PowerCivil (V8i)
- Bentley® Power GEOPAK (V8i), Power InRoads (V8i)
- Full support for 32 and 64-bit operating systems
- System requirements:
  Workstation: Windows® XP, Vista, Windows® 7
  Network: Windows® Server 2000, 2003, 2008

HOW TO CONTACT US

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